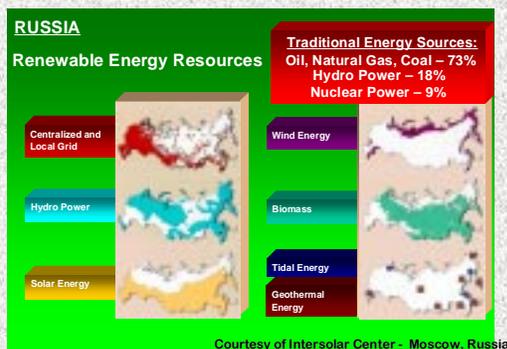


Russian Federation

Vahan Gevorgian (NREL)



U.S. DOE/Russian Ministry of Fuel and Energy: Joint Collaboration for Renewable Energy Resources in Russia

- Agreement by Joint Committee of Economical and Technical Cooperation between Prime Minister Chernomyrdin and Vice President Gore (September 1993) to examine options for Russia's energy future (including EERE)
- Memorandum of Cooperation signed by Russian Minister of F&E Yuri Shafrannik and U.S. DOE Secretary Hazel O'Leary (October 1993)
- Establishment of EERE Joint Coordinating Committee by Russian Deputy Minister Vitaly Bushuev and U.S. DOE Assistant Secretary Christine Ervin (October 1994)
- Meeting between NREL and Russian Ministry of F&E representatives to establish Renewable Energy working group and prepare program implementation plan (November 1994).

NREL's Participation in the U.S./Russia Cooperative Program for Renewable Energy Resources

- Technical assistance in design, installation, and operation of 21 wind/diesel hybrid systems in Russia's Northern Territories (40 BWC wind turbines with related equipment had been purchased and shipped to Russia in 1996 using USAID CIP funds)
- Feasibility study and installation of a 1-MW biomass power plant in Arkhangelsk region
- Assistance in the start-up operation of a 2-MW/yr triple junction a-Si manufacturing facility in Moscow using U.S. technology
- Explore possibilities of financing large-scale wind/diesel hybrid and biomass power systems for the Russia's Northern Territories (900 sites)
- Develop the strategic plan for electrification of Russian Northern Territories
- Feasibility studies done for large utility-scale wind farms in Southern Russia (Krasnodar/Novorossisk) and Russian Far East (Nakhodka).



Wind/diesel hybrid system at Krasnoe Village, Arkhangelsk Region

Installation of Wind/Diesel Hybrid Systems in Russia's Northern Territories

- Three systems in Arkhangelsk and Murmansk are fully operational.
- Fourteen more wind turbines are being installed in Chukotka.
- NREL has provided training for Russian specialists in using of Hybrid2 computer model and operation of DAS for remote hybrid systems.
- Five sets of monitoring equipment have been purchased by NREL to be installed on operational hybrid systems.
- Remaining systems are expected to be installed by the end of 1998.
- Wind/diesel test facility will be established with NREL assistance in Istra, near Moscow.

Feasibility Study for 1-MW Biomass Power Plant in Arkhangelsk Region

- Several site visits were made in 1996-1997 to the village of Verkhne-ozerski, in the Onega Region of Arkhangelsk Oblast, to evaluate the feasibility of building biomass-combustion electric power plants, using waste forest products.
- A detailed pre-feasibility study was completed for a 470-kW power plant in Verkhne-Ozerski in 1998, that showed the economic viability of such a power plant. The plant will use 13,000 tons of wood waste, available near the village.
- The design is being expanded to include three more villages. The power plant's capacity is being increased to 1 MW. The feasibility study should be complete by the Spring of 1999. The MFE has been authorized by the World Bank to allocate up to US\$3M towards the construction of the power plant.
- The U.S. Trade and Development Agency is planning to fund a comprehensive study that will include four 1-MW biomass electric power plants in the Arkhangelsk region in FY99.



Site for a 1-MW Biomass Power Plant in Verkhne-Ozerski village, Arkhangelsk Region that will burn nearby wood waste.